

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH
DRINKING WATER SECTION

WHAT TO DO IF COLIFORM BACTERIA ARE DETECTED IN A PWS

Purpose:

To provide public water systems (PWS) with a procedure to follow when Total Coliform Rule (TCR) or Ground Water Rule (GWR) sample results indicate the presence of total coliform bacteria, E. coli or other fecal indicators.

References:

Section 19-13-B102 of the Regulations of Connecticut State Agencies (RCSA)
Code of Federal Regulations (CFR) Section 141.402

TCR Maximum Contaminant Level (MCL) Compliance:

The results of all routine and repeat samples not invalidated by the Drinking Water Section (DWS) shall be included in determining compliance with the MCL for total coliforms. The three criteria for invalidation of a total coliform positive sample by the Department are outlined in Section 19-13-B102(e)(7)(F) of the RCSA. Requests for invalidation of positive samples must be in writing.

Non-acute TCR MCL violation:

- For a PWS which collects fewer than 40 samples per month, if more than one sample collected during a month is total coliform positive, the PWS is in violation of the MCL for total coliforms.
- For a PWS which collects at least 40 samples per month, if more than 5 percent of the samples collected during a month are total coliform positive, the PWS is in violation of the MCL for total coliforms.

TCR MCL Violation Examples:

- For a PWS which normally collects one routine TCR sample per month or quarter, if that routine sample is total coliform positive AND any repeat sample is also total coliform positive, the PWS is in violation of the MCL for total coliforms.
- For a PWS which collects more than one routine TCR sample per month or quarter but fewer than 40 samples per month, if more than one routine sample or any repeat sample is total coliform positive, the PWS is in violation of the MCL for total coliforms.
- If a PWS collects 50 samples per month and any combination of 3 or more routine or repeat samples are total coliform positive, the PWS is in violation of the MCL for total coliforms.

Acute (fecal coliforms or E. coli) TCR MCL violation:

- A PWS has an acute MCL violation for total coliforms if **ANY** repeat sample is fecal coliform or E. coli positive **OR** if a routine original fecal coliform or E. coli positive sample is followed by a total coliform positive repeat sample.

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WHAT TO DO IF A ROUTINE TCR SAMPLE IS POSITIVE FOR TOTAL COLIFORMS:

1. A PWS must have the original routine total coliform positive sample analyzed for fecal coliforms or E. coli. If the routine total coliform positive sample is positive for fecal coliforms or E. coli, the PWS must notify the DWS by the end of the day on which the PWS is notified of the positive fecal coliform or E. coli sample but no later than 96 hours from the time of sample collection. If the DWS is closed, notification must be made before the end of the next business day.
2. A PWS must collect repeat samples for every routine total coliform positive sample in accordance with the following table (even if the PWS has determined that it has already violated the MCL for total coliforms):

Table 1

Routine # Samples/Month	# Repeat Samples Required
1/month or fewer (i.e. quarterly)	4
> 1/month	3 per positive routine sample

Repeat samples must be collected within 24 hours of the confirmed routine sample positive result. The 24 hour time limit may be extended to no more than 96 hours provided the PWS verifies that their contract laboratory is closed for the weekend or holidays or the sample sites are unavailable. **This extension must be requested and granted before the original 24 hour period expires.**

Total Coliform Rule Sample Site Location Requirements

- One repeat sample must be collected from the sampling tap where the original total coliform positive sample was collected.
 - One repeat sample must be collected from a sampling tap within 5 service connections upstream of the original sampling site.
 - One repeat sample must be collected from a sampling tap within 5 service connections downstream of the original sampling site.
 - A PWS required to collect 4 repeat samples must collect the fourth repeat sample from any other sampling tap in the distribution system. Ground Water Rule Sample Site Location Allowance: A PWS serving 1,000 people or fewer may use a triggered sample collected from a ground water source under the GWR (described below) to meet the other TCR repeat sampling requirement. In this case, the triggered sample result shall be used to determine compliance for both the TCR and GWR. Note: If a system chooses this option and has more than one ground water source, the triggered sample results from all ground water sources will be considered for TCR compliance.
3. A PWS must collect triggered source water sample(s) per the GWR within 24 hours of each routine TCR positive sample and have the sample(s) analyzed for E. coli (or other fecal indicator as specified by DWS) unless the PWS has a DWS approved 4-log virus treatment system installed and operational or the PWS received an exemption from DWS for triggered source water monitoring. DWS will specify how much time the PWS has to collect the triggered groundwater source sample if the sample cannot be taken within 24 hours due to

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circumstances beyond the PWS control. A triggered source water sample must be collected from each active source of supply “in use” at the time each positive routine TCR sample was collected. “In use” means when water from an active source of supply is, or could possibly be, at the monitoring site at the time of routine TCR sample collection. If any triggered source water sample is positive for E. coli, five (5) additional source water samples must be collected and analyzed for E. coli (or other fecal indicator as specified by DWS). If any triggered source water sample is positive for total coliform but negative for E. coli, no additional monitoring is required under the Ground Water Rule for that source. **Disinfection measures cannot be undertaken until all test results are received for the triggered and additional source water samples.** In order to comply with the triggered source water monitoring requirements of the GWR, each groundwater source of supply will be required to have a dedicated sample tap installed prior to any storage or treatment facility. Additional guidance on complying with the triggered source water monitoring requirements and other components of the GWR is available on the DWS website.

4. It is recommended that a PWS collect investigatory total coliform samples after each treatment unit and from each storage facility to determine if the source of bacteria is originating from these facilities. Some of these facilities may not have dedicated sample taps, therefore, investigatory samples should be collected as close to the facility as possible, and prior to disinfection or other interim measures.
5. A consecutive PWS that has a total coliform-positive sample collected under the TCR must notify the wholesale PWS(s) within 24 hours of becoming aware of the total coliform-positive sample. A wholesale ground water PWS that receives notice, from a consecutive PWS it serves, that a sample collected under the TCR is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) and analyze it for E.coli. If the sample is E.coli positive, the wholesale ground water PWS must notify all consecutive PWS(s) served by that ground water source of the E.coli source water positive within 24 hours of becoming aware of the ground water source sample monitoring result. The wholesale ground water PWS must collect five (5) additional source water samples from the same source within 24 hours of becoming aware of the E.coli positive sample.
6. A PWS that is required to temporarily increase TCR monitoring to five routine (5) samples the month after a routine total coliform positive sample must collect the triggered ground water source samples in accordance with their normal routine TCR schedule.

Example 1: A PWS with a TCR schedule of two (2) routine samples per month has a routine total coliform positive sample in July. All appropriate triggered ground water source samples were collected in July and were negative. The system is required to temporarily increase TCR monitoring to five (5) routine samples in August. Three (3) of the five (5) routine samples collected in August are positive for total coliform. Two (2) triggered ground water source samples per source would be required since the normal TCR monitoring schedule is two (2) routine samples per month.

Example 2: A PWS with a TCR schedule of one (1) routine sample per quarter has a routine total coliform positive sample in July. The triggered ground water source sample was collected in July and was negative. The system is required to temporarily increase TCR monitoring to five (5) routine samples in August. All five (5) routine TCR samples in August are positive for

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total coliform. No triggered ground water source samples would be required because a triggered ground water source sample was already collected in July in accordance with the PWS routine quarterly schedule.

Example 3: A PWS with a TCR schedule of one (1) routine sample per quarter has a routine total coliform positive sample in September. The triggered ground water source sample was collected in September and was negative. The system is required to temporarily increase TCR monitoring to five (5) routine samples in October. All five (5) routine TCR samples in October were positive. Since October is the start of the next quarter, the PWS must collect one (1) triggered ground water source sample per ground water source because one of the five (5) routine samples collected in October is the quarterly routine TCR sample for the PWS.

WHAT TO DO FOLLOWING THE RESULTS OF THE REPEAT OR TRIGGERED GROUND WATER SOURCE SAMPLES:

A. If all repeat samples are absent for total coliforms:

1. A PWS must temporarily increase the number of routine TCR samples required in the month following a routine total coliform positive sample in accordance with the following table:

Table 2

Routine # Samples/Month	# Routine Samples Next Month
1/month or fewer (i.e. quarterly)	5*
> 1/month but < 5/month	5*
5/month or more	Continue to collect in accordance with Table 1 of Section 19-13-B102(e)(7)(A) of the RCSA

*must continue monthly until all 5 samples are absent for total coliforms

B. If any repeat sample is positive for total coliforms and the original routine sample was fecal coliform or E. coli negative:

1. a.) For a PWS which collects fewer than 40 routine TCR samples per month, if any repeat sample is positive for total coliforms, or
b.) For a PWS which collects at least 40 samples per month and more than 5 percent of the total number of samples (including repeat samples) collected during the month are positive for total coliforms, the PWS is in violation of the MCL for total coliforms and must:
 - Report the TCR MCL violation to DWS **AND** Local Health Department (LHD) by the end of the next business day after learning of the results. **Do not leave voice message!**
 - Notify consumers in accordance with Section 19-13-B102(i)(2)(A) of the RCSA as soon as practical but no later than 30 days after the PWS learns of the violation. The DWS can provide a public notification template upon consultation.
2. The PWS should follow up notification to DWS and LHD by completing the [Public Water System Notification Form To Confirm Compliance With Sections 19-13-B46 & 19-13-B102 Of The Regulations of Connecticut State Agencies \(RCSA\)](#) form. This form is available on the

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DWS website and should be submitted no later than the end of the following business day after notification to DWS and LHD has occurred.

3. After all required triggered and additional ground water source monitoring is conducted per the GWR as noted earlier, a groundwater PWS should disinfect the water system in accordance with [Disinfection of a Well Water Supply](#) guidance document located on the DWS website. A PWS that normally does not continuously chlorinate water should notify its customers in advance that the system will be chlorinated and why the system is being chlorinated.
4. A PWS that already disinfects continuously should assess the distribution system to determine if chlorine residuals are maintained throughout the distribution system. A minimum free chlorine residual of at least 0.2 mg/l should be maintained at the extremities of the distribution system. Flushing and/or increase in chlorine dosage may be necessary depending on the assessment.
5. The PWS should collect follow-up samples after the chlorine has dissipated or returned to normal levels to confirm the effectiveness of the disinfection procedure. Repeat the disinfection procedure as necessary.
6. The PWS should assess compliance with the latest sanitary survey and conduct an investigation of the water system to try to determine the cause for the presence of total coliforms. The investigation should, at a minimum, include the sanitary condition of the well construction, any apparent sources of pollution near the source(s) of supply, sanitary condition of any treatment system, sanitary condition of storage tanks including overflows, vents, and hatches, low pressure problems or customer complaints, and if there was any recent system repair work done and proper disinfection procedures were followed.
7. The PWS must collect the required number of routine samples the following month in accordance with Table 2.

**C. If any repeat sample is positive for fecal coliforms or E. coli, OR
If any original routine sample is positive for fecal coliforms or E. coli and is followed by
a repeat sample this is positive for total coliforms**

1. The PWS has incurred an acute TCR MCL violation and must notify DWS **and** LHD as soon as practical but no later than 24 hours after the PWS learns of the acute TCR MCL violation.
 - During Week day Business Hours of 8:30 a.m. to 4:30 p.m., please contact the DWS office at 860-509-7333. During this time, please request to speak to a compliance engineer, this direct contact will meet regulatory notification requirements.
 - **Do not leave a voice message during normal business hours! Please request to speak with a DWS staff from the Compliance Regions, during business hours there is always a staff present that can assist.**
 - During non-business hours call the DPH emergency number (860-509-8000) to report the TCR acute MCL violation and follow up with the DWS during the next business day.
2. The PWS must consult with DWS as soon as practical but no later than 24 hours after the PWS learns of the acute TCR MCL violation.
3. The PWS must implement interim measures as directed by the DWS per the [Interim Measures Standard Operating Procedure](#), which is available on the DWS website.

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4. The PWS must notify its customers in accordance with Section 19-13-B102(i)(1)(A) of the RCSA as soon as practical but no later than 24 hours after the PWS learns of the violation. The DWS can provide a public notification template upon consultation.
5. The PWS should follow up notification to DWS and LHD with a [Public Water System Notification Form To Confirm Compliance With Sections 19-13-B46 & 19-13-B102 Of The Regulations of Connecticut State Agencies \(RCSA\)](#). This form is available on DWS website and should be submitted no later than the end of the following business day after notification to DWS and LHD has occurred.
6. After all required triggered and additional ground water source monitoring is conducted per the GWR as noted earlier, the groundwater PWS should disinfect the water system in accordance with *Disinfection of a Well Water Supply* guidance document located on DWS website. A PWS that normally does not continuously chlorinate water should notify its customers in advance that the system will be chlorinated and why the system is being chlorinated.
7. A PWS that already disinfects continuously should assess the distribution system to determine if chlorine residuals are maintained throughout the distribution system. A minimum free chlorine residual of at least 0.2 mg/l should be maintained at the extremities of the distribution system. Flushing and/or increase in chlorine dosage may be necessary depending on the assessment.
8. The PWS should collect special (non-compliance) samples after the chlorine has dissipated or returned to normal levels to confirm the effectiveness of the disinfection procedure. Repeat the disinfection procedure as necessary.
9. The PWS should assess compliance with the latest sanitary survey and conduct an investigation of the water system to try to determine the cause for the presence of total coliforms. The investigation should, at a minimum, include the sanitary condition of the well construction, any apparent sources of pollution near the source(s) of supply, sanitary condition of any treatment system, sanitary condition of storage tanks including overflows, vents, and hatches, low pressure problems or customer complaints, and if there was any recent system repair work done and proper disinfection procedures were followed.
10. The PWS must collect the required number of routine samples the following month in accordance with Table 2.

D. Any GWR Triggered Ground Water Source Sample is positive for E.coli

1. If the E.coli positive triggered ground water source sample is not invalidated and DWS does not require corrective action, the PWS must collect five additional ground water source samples from the same source within twenty-four (24) hours of being notified of the E. coli positive sample prior to disinfection or other interim measures.
2. A wholesale ground water PWS that receives notice from a consecutive PWS it serves that a TCR sample is total coliform positive must within twenty-four (24) hours of being notified, collect a sample from its groundwater source(s) and analyze it for E.coli. If the sample is positive for E.coli the wholesale groundwater PWS must notify all consecutive systems served by that groundwater source of the E.coli positive sample within twenty-four (24) of being notified of the groundwater source sample monitoring result. The wholesale PWS must also collect five additional source water samples from the same source within twenty-four (24) hours of being notified of the E.coli positive sample.

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3. A ground water system with a ground water source sample that is E.coli positive including consecutive systems served by the ground water source must issue a Tier 1 public notice as soon as practical but no later than twenty-four (24) hours of learning of the results.

Drinking Water Section (DWS) and Local Health Department (LHD) Contact Information:

DWS:

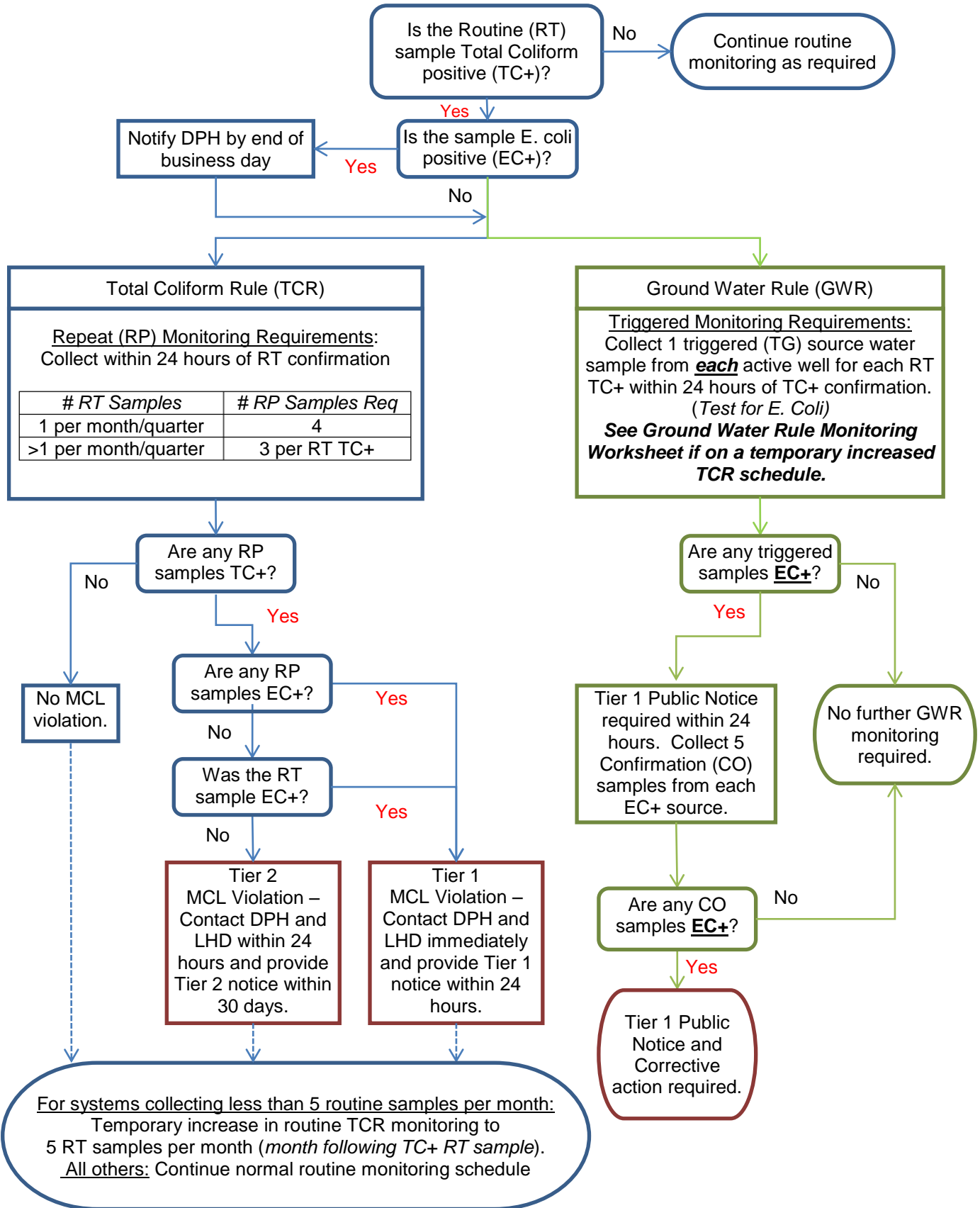
- DWS phone number during normal business hours (8:30–4:30): **860-509-7333**.
- DPH after-hours emergency phone number: **860-509-8000**

LHD: https://www.han.ct.gov/local_health/localmap.asp

Please contact a DWS compliance staff member for additional assistance as needed.

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Ground Water Rule Triggered Monitoring Worksheet

Systems collecting five (5) routine samples in the month following a routine TC+ sample

